INTRODUCTION
Fusarium crown rot, caused predominately by the stubble-borne fungus *Fusarium pseudograminearum*, is one of the major root and crown disease constraints on cereal production in Australia. In 2009 it was estimated to cost Australian grain growers $97 million annually in wheat and barley (1, 2). WA’s losses to this disease were estimated at $7 million which may be largely underestimated. In 2014, many growing regions in WA were impacted by crown rot, exacerbated by dry weather conditions during grain fill. For example, reports from Merredin indicated that crown rot affected 30-50% of wheat paddocks.

Several new wheat varieties have been released recently with improved tolerance to crown rot. No experimental field evidence is currently available to grain growers of the effect of crown rot on variety yields in WA. Hence, there is an on-going need to evaluate wheat and barley varieties to demonstrate to growers the economic benefits of adoption of varietal selection in paddocks with high crown rot pressure.

MATERIALS AND METHODS
Barley and wheat field experiments were sown at Merredin and Wongan Hills Research Stations on 28 May and 4 June in 2014 and will be repeated in 2015 and 2016. Each experiment had 12 varieties in paired plots, plus/minus *F. pseudograminearum* inoculum, with 4 replications. At Wongan Hills no crown rot DNA was detected in the soil, while at Merredin a high level of background inoculum resulted in significant infection in un inoculated plots. Data presented here is from Wongan Hills. Grain yield (t/ha) and level of disease as the number of white heads were measured.

RESULTS
All barley and wheat varieties had some level of disease and yield reductions (Figure 1 and 2) in inoculated plots with significant differences evident between varieties. In barley, Litmus, La Trobe and Baudin had the lowest yield reduction from crown rot inoculation, with Litmus being the highest yielding variety in presence of crown rot (Figure 2). A similar trend in variety yield response was observed at Merredin.

![Figure 1. Grain yield (12 varieties) and white head incidence (6 varieties) for barley in nil and *Fusarium pseudograminearum* inoculated plots at Wongan Hills in 2014. Crown rot resistance rankings are not available.](image1)

![Figure 2. Grain yield and white head incidence for 12 wheat varieties in nil and *Fusarium pseudograminearum* inoculated plots at Wongan Hills in 2014. Resistance rankings for Emu Rock and Trojan are moderately susceptible (MS), Magenta is MS to susceptible (MSS), and remaining varieties are susceptible to crown rot.](image2)

DISCUSSION
This is the first report of inoculated crown rot field experiments to evaluate infection and yield loss in barley and wheat varieties in WA. All varieties of barley or wheat were found to be affected by the disease and all had some level of yield reduction, however, significant differences between varieties were evident.

The results show that variety choice under crown rot inoculum can have an impact on yield. For example, under crown rot inoculum, Emu Rock yielded 300 kg/ha more than Mace, the variety of choice in 60% of the cropping area of WA in 2014. However, in the plots without crown rot, Mace out-yielded Emu Rock by 200 kg/ha. These preliminary results indicate that understanding the crown rot disease history of a paddock and choosing varieties with appropriate disease resistance ranking can influence crop yield performance.

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REFERENCES